The Chemical Age

A Weekly Journal Devoted to Industrial and Engineering Chemistry

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The Central Register Re-examined

TANKS, in the sense of armoured fighting vehicles, were, as is well known, a British invention which revolutionised the course of the last war. We know to our cost how well the enemy has adapted that invention of ours to his own uses. It does not seem unreasonable, therefore, to take a leaf out of the enemy's book and adapt a scheme of his to our purposes.

The German mind is generally admitted to be systematic; and there is no doubt that much thought has been applied in Germany to the systematisation of the supply of labour for industry. In this, as in everything else, the German goes too far; but surely we, with our universally recognised talent for compromise, can make use of the basic idea of the German labour supply system without carrying it to extremes. The idea, indeed, exists in this country already. We are told that there is in being an index of sorts called the "Central Register," and another index known as the "Supplementary Register." These have been compiled, it appears, in many different ways, partly voluntarily, partly compulsorily, with the idea that Government departments, and concerns engaged on national work generally, should be able to obtain from these registers the names of persons willing to engage in a form of national work in which their capacities could be best used.

The idea is an excellent one, and a first-class tool has thereby been forged; but a first-class tool is precious little use lacking a skilled workman to wield it. And a general notion seems to exist that in this instance the wielding of the tool has been left in the hands of incompetent amateurs; in short, that the Central Register doesn't work. This is perhaps an exaggeration of the actual state of affairs, for although it is unusual nowadays to come across anyone who has found satisfactory employment by means of the Central Register alone, at the beginning of the war, when chemists by the hundred were required by some of the new ministries, it did serve a useful purpose. Also we have the Minister of Labour's word that in the months of July, August, and September this year 1198 persons had been appointed from the Central Register, and 2544 from the Supplementary Register. He does not, however, state the nature of the appointments, and it appears from various sources that these appointments must be mostly of a very subordinate nature. Only last month a metallurgist, an M.Sc. of several years' managerial experience, revealed, in a letter to the Press, that Central Register officials say they seldom receive inquiries for people requiring a salary commensurate with his experience.

One of the cardinal defects of the Central Register is that its function is not to find posts for scientific workers, but to find scientific workers for posts; and even this one-way line of action is not pursued to the fullest extent. What is wanted is a competent body of men with technical knowledge to make a review or survey both of the field of urgently essential jobs and of the supply of available workers, so that the latter may be applied to the former. There seems to be no trustworthy record kept of workers who are no longer available for a post, employment having been found for them through one of the normal channels, such as the employment bureaux of universities or chemical societies. Furthermore, there is too great a tendency to adopt a weak policy of not treading on people's corns; in many cases the word of an employer that a certain employee is essential is taken without investigation, even though the employee feels he could be working more usefully for the national effort and has applied for a transfer. It has been established that the Central Register has the right to overrule the decisions of the local National Service Officer regarding the transfer of workers, but so far as we know this right has never been exercised.

There is one thing to be said for the Register, however, and that is that it is not as bad as it used to be. Some of the reforms that we suggested in our leading article of July 26 last seem to have been adopted. The "incompetent amateurs," who have been regarded by the general public as superintending the work of the Register, have been replaced, or at any rate supplemented, by men of expert technical knowledge, who have some conception of the right man for the job. The result is that offers of grossly unsuitable employment are on the dwindle, and we shall probably not have a repetition of such anomalies as the notorious offer of a £3-a-week job to the president of a learned institution. Admittedly, the Central Register has nothing to do with the payment for the jobs offered; but a few such mistakes as this undermine any belief in the value of the institution that commits them. Unfortunately, the undermining has gone on for some time, and the expert advisers now on the Register have an uphill task. We are credibly informed, for instance, that the Ministry of Agriculture has found the Central Register so unsatisfactory that it no longer notifies any vacancies to the Register, but fills them through pre-war channels.

All this is rather a pity, because apart altogether from its utility as a one-way employment agency, the Central Register is capable of being a real record of scientific workers throughout Britain, and as such could be of priceless and permanent value in rebuilding the scientific and technical structure of the nation.

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NOTES AND COMMENTS

Propaganda about Plastics

INFORMATION has been received from leading United States industrialists that propaganda is current there to the effect that the plastics industry and other trades in Britain are still producing unreasonable quantities of non-essential articles and are seeking to take advantage of the present situation by entering into competition with America in certain export markets. The purpose of these insinuations, which undoubtedly emanate from Germany, is to mislead the American people into thinking that British industry is not taking the war seriously and yet is asking the United States for the maximum amount of assistance in the shortest possible time. The above is reported by the British Plastics Federation, Ltd., who further affirm that there is no truth whatever in this propaganda. The large majority of members of the British plastics industry are engaged almost, if not entirely, on vital work for Service Departments, particularly the Ministry of Aircraft Production, and the uses to which the industry's raw materials are devoted are strictly supervised by the Ministry of Supply, and those firms which, before the war, specialised in the manufacture of fancy articles have switched over completely and perforce to Government and other essential contracts. It is a significant feature of this war that British labour simply will not carry out work which is not of national importance, and any plastics manufacturer who tried to continue producing non-essentials would not only find it impossible to obtain the necessary raw material, but would be unable to retain his employees.

Factory Doctors

POSITIVE support to the plan, commented upon in our issue for August 16, of establishing medical officers throughout industry has been forthcoming. The British Medical Association has recently published the report of its special committee appointed to consider medical services in factories. Our former remarks are fully upheld. There is a very real need for such a service—this is at once apparent when it is considered that industry loses some 31,500,000 weeks' work in a year, largely owing to colds, influenza, and gastric complaints, and that the annual financial loss from accidents to workers is estimated at £30,000,000. These serious losses could, in the opinion of the committee, be largely reduced if arrangements were made for the medical care of the workers during working hours. The task of the doctor, however, would not be to tour the works, nonchalantly applying his stethoscope to this and that worker. The report defines medical supervision as entailing a continuous watch on the "individual in his industrial environment; the prevention as far as possible of physical and mental illness; a service for the initial treatment of injury; and an efficient medical liaison between the factory and outside medical services, such as the patient's own doctor, the hospital, the public health authority, and the rehabilitation services." A closer association between medical men and industry should result in a deeper insight, among both doctors and employers, into the part played by industrial factors in causing ill-health and disease. On the general introduction of medical services into industry, the Association contends that it does not call for an elaborate or expensive organisation. Small firms might appoint a part-time medical officer or else combine with other firms to make a joint whole-time appointment. Moreover, the report goes on to recommend the establishment of an advisory body to aid employers on selecting a medical officer.

Peat as Industrial Fuel

ECONOMIC utilisation of peat is a subject that has provided many a headache for fuel chemists in this country; in the neighbouring state of Eire it is a topic that is hardly safe to mention. Some notes on the problem in the November issue of the *Anglo-Swedish Review* are of interest, in that they provide an indication as to how this stubborn material may be dealt with, though they do not attempt to provide a complete solution. The difficulty, from the economic point of view, in using peat as an industrial fuel, is the elimination of the high water content. Raw peat contains as much as 90 per cent. water, and all attempts to remove this water by mechanical pressure have failed, as the water-containing cells refuse to burst under pressure. A process, first put into operation in Sweden about ten years ago, utilises the sun's heat to remove the water. A thin layer 10 to 12 mm. thick, cut from the surface of the bog and left to dry for 2 to 3 hours, is found to have its water content reduced from 90 to 50 per cent. This "fraize-peat," if exposed to the sun somewhat longer, is susceptible of a reduction of water content to as low as 25 per cent., and makes quite a satisfactory industrial fuel of fibrous or powdery nature with an effective heating value of 2000-2800 cal. and 4-5 per cent. ash. It can be burned in ordinary boiler furnaces and can be used as a substitute for up to 80 per cent. of low-grade coal. If it is desired to burn only fraize-peat, special furnaces must be used. A.B. Svensk Torvförädling (Swedish Peat Refining, Ltd.) has operated peat-fraizing machinery on a large scale in Scania (S. Sweden), and is installing further plant of the same nature. Artificial drying of the fraize-peat reduces the water content to as low as 10 per cent. and the powder fuel thus produced is easier and completer in combustion than coal dust. It must, however, be transported in special trucks and cannot be bunkered or stored, as it is liable to self-ignition. Artificial drying methods, and most of the peat-fraizing machinery used on the bog, have been evolved by Peco, Ltd., of London; and briquetting of the peat powder has likewise been found most effective. Swedish Peat Refining, Ltd., has a capacity of 70,000 tons of briquettes per annum, and is now undertaking research on the extraction of peat-gas, coal, and tar, from the peat in the Scanian mosses.

B.S.I. Executive Committee

Appointed to Cope with Increased Work

OWING to the continual expansion of the work of the British Standards Institution and the development of its relations with the Government departments and with standardising authorities overseas, the general council has appointed an executive committee under a permanent chairman. This committee will keep all the activities of the Institution under review and report to the general council from time to time as may be necessary. Mr. C. le Maistre, C.B.E., who for the past 25 years has been chief executive officer, has been appointed full-time chairman of the executive committee, and Mr. P. Good, C.B.E., for several years deputy director and recently joint-director, has been appointed director and secretary.

British Association of Chemists

Annual Report of the Council

THE 24th annual general meeting of the British Association of Chemists was held at the Café Royal, Regent Street, London, on November 29. In the absence, owing to illness, of Professor F. G. Donnan, retiring president, the chair was taken by the Chairman of the Council, Mr. J. H. Dent. Dr. William Cullen was present as a guest, and in reply to a toast, spoke of his hopes and plans of unifying the 20,000 or so chemists of this country into one group, instead of, as at present, having them represented by 10 or 12 bodies.

Before the annual report was presented, the death of 11 members, among whom were Prof. A. J. Green and Mr. J. R. Johnson, was recalled by a few minutes silence. The Hon. Treasurer, Mr. W. H. Woodcock, reported a balance of £56, and Miss W. Wright, chairman of the Unemployment Special Purposes Committee, announced that the total amount of benefits paid was again a modest sum. On the subject of membership a rather less encouraging picture was presented. The total number of members was 2247, new members totalled 156, there were 29 resignations and 51 names had been removed from the register. This was the place, said Mr. Dent, reviewing the situation, where a research staff should be brought in, but no such staff was available to assist them. On the election of Dr. A. E. Dunstan as president, the chairman said that the Council was honoured and delighted to hear that Dr. Dunstan had agreed to assume that position, where his vigorous outlook would be of great benefit. In seconding the appointment, Mr. C. S. Garland observed that he knew Dr. Dunstan far too well to say all that he knew about him there. The appointment was greeted with applause. Dr. J. J. Fox, President of the Institute of Chemists, sent a telegram of greetings and good wishes to the meeting.

The assembly then went on to consider the first resolution "That this annual meeting approves affiliation with the T.U.C. and instructs Council to submit the matter to a postal ballot." Speakers went to some length to examine the possible gains and losses from such an affiliation and several maintained that the Association would be moving into political spheres. A member of the sub-committee set up to consider the subject took an impersonal view, saying that it was the task of the committee to place the facts only before the members, and eventually, on the suggestion of Mr. F. Page Evans, of Manchester, another resolution was passed instructing the Council to investigate the matter further, and the original resolution was withdrawn. Many members maintained that it was first necessary to unify the whole body of chemists before any action was taken.

Dr. A. E. Dunstan, President B.A.C.

It was further resolved, after some discussion, that "the annual general meeting views with favour the election of section committees, and also of Council, by postal vote," but the remaining sections of a resolution dealing with the system of election and the amendment of the rules of the Association were re-cast for further discussion and a ballot by post.

Reconditioning Zeolites

Commercial Process Evolved

RESEARCH work on the reconditioning of zeolites, carried out in the laboratory of John Thompson (Kennicott Water Softeners), Ltd., is reported by A. Klein in *J.S.C.I.*, 1941, *60*, 10, p. 262.

Many attempts have been made, the author states, to recondition zeolites which have been contaminated by iron, manganese, or organic matter, *e.g.*, by methods of treatment with dilute acid or salt solutions. So far, no satisfactory results have been obtained, such chemical treatment having restored less than 50 per cent. of the original exchange capacity. To-day, when shipping restrictions make it necessary to use all imported goods to their maximum efficiency, it is important to increase to the limit the possibility of the recovery of contaminated zeolites. Klein has examined this problem in detail and has succeeded in devising a process for restoring to a very high degree the exchange capacity of a contaminated zeolite. The method, for which patent application has been made, is best illustrated by describing an actual treatment.

An Australian greensand chemically treated for an exchange value of 5500 grains of calcium carbonate per cubic foot had been in use for water softening for five years. The water to be softened had been pretreated by lime. The zeolite was fully contaminated with calcium carbonate, iron oxide, and organic matter, and had entirely lost its exchange and regeneration properties. The greensand was considered worthless and fit only for waste.

To recondition the material it was first put through a 20-mesh sieve to remove gravel, and then through a 60-mesh sieve to remove dust. In this way, 15 per cent. of the material as delivered was discarded. The remaining greensand was treated with 30 per cent. sulphuric acid at 100° C. for about 30 minutes, followed by washing until wash water was clear. It was then treated with 60 per cent. sulphuric acid for one hour at 100°. In both treatments care was taken that the greensand was in intimate contact with the acid. After further washing free from acid, the material was dried and treated with an alkaline solution of sodium aluminate containing also preferably sodium chloride, the process being so carried on that the greensand was in intimate contact with the solution. After 20 minutes' heating at 100°, the greensand was dry and was then washed out until all excess of alkali was removed. The greensand was then stabilised by treatment with 2 per cent. solutions of sodium silicate followed by aluminium sulphate and was then ready for use.

Comparative tests of zeolites thus reconditioned and new zeolites were carried out. The experimental filtrations were carried out in glass tubes of equal size under exactly comparable conditions. The amount of salt solution for regeneration was also equal, corresponding with 0.45 lb. of sodium chloride for 1000 grains of calcium carbonate removed. Experiments showed that the reconditioned zeolites were stable and had the same exchange value as the new material. As a result of this work, the reconditioning of contaminated zeolites is now to be regarded as commercially practicable.

A CHEMIST'S BOOKSHELF

SHEET-METAL WORK. By F. Horner; edited by A. Regnauld. London: The Caxton Publishing Company. 3 vols. Pp. 210, 299, 247. 75s.

The author, assisted by eight expert contributors, presents in this comprehensive three-volume publication an abundant and up-to-date encyclopædia of the whole sheet-metal industry. It includes not only a sound working knowledge of the established methods used in the production of the extremely wide range of sheet-metal articles, but also all important improvements and developments of recent times in machines, equipment, tools and actual processes. The metals handled in sheet-metal work are iron, steel, alloy steels, stainless iron and steels, tinplate, galvanised sheet, copper, copper alloys, gunmetals and bronzes, aluminium, aluminium alloys, lead (especially important for the chemical industries), zinc, precious metals, etc. The initial processes on sheets and strips, such as tinning, galvanising, polishing, etc., are described *in extenso* and a special chapter deals with plastics, as the tendency to employ plastic materials in the production of a great number of articles, hitherto only made in sheet-metals, rendered it essential to take note of this new development.

Not only are the various methods of hand-craftsmanship described and illustrated, but also the intermediate and the mass production processes, now employed on such an extensive scale for the manufacture of sheet-metal and plastic articles, are fully and lucidly dealt with.

The three volumes are divided into 34 distinct sections. Over 700 illustrations in the text and 24 full-page photographic plates serve to enhance the value of the book in depicting many of the principal machines and methods described in the text. A multitude of tables and other data give useful information of special interest to sheet-metal workers; they include instructions on the weight of sheet-metals, gauges and thicknesses, weights of metals in strip form, standard compositions of hard and soft solders, wire-gauge sizes and screw-thread sizes, and other data on weights, measures, and equivalents. A full and comprehensive index gives further help and permits easy reference to any of the numerous subjects dealt with. The book is to be recommended to all those whose interest and work is in any way related to the sheet-metal industries.

As an unique service it may be mentioned that every purchaser of the book is presented with a pamphlet containing twelve coupons, each of which can be used to ask for free information on any subject associated with sheet-metal work. This is indeed a new departure in scientific literature for practical application.

CHEMICAL WARFARE. By Curt Wachtel. London: Chapman and Hall. Pp. 312. 24s.

This semi-popular treatise, written in the hope that it will be helpful to the military of the author's adopted country—the United States—is undoubtedly interesting and can be valuable if read with care, patience, and discrimination. Dr. Wachtel organised the pharmacological section of the Kaiser Wilhelm Institute during the First German War and was an instructor at the Military School of Noxious Gases in Germany. He was also a disciple and a fervent admirer of Fritz Haber, the chemist who managed the gas warfare of Germany in 1915-18 and developed the famous process for nitrogen recovery that bears his name. It is significant that Haber, because of his Jewish parentage, had to leave Germany shortly before his death in 1935. Dr. Wachtel also, though he does not say why, is found advising the French and Russian governments on questions of chemical warfare in 1935-37, before settling in America.

The author certainly knows his subject; but the book has certain grave defects, dangerous in a technical work. Never has this reviewer had to cope with so many misprints in a technical work of this character and price. Formulæ are wrongly stated, the wrong names of compounds are attached to formulæ, and in one instance, on p. 249, the use of an erroneous name for a compound makes nonsense of a whole paragraph. Furthermore, either Dr. Wachtel or his translator betrays a knowledge of English idiom by no means perfect, with the result that misconceptions may easily arise.

If these blemishes are borne in mind, however, the book can be of great importance. The historical sections are of the highest interest and have an undoubted bearing on present-day conditions. The experience of the German authorities with different kinds of chemical weapons is most illuminating; the author shares the opinion of Haber that the Lewisites (chlorovinyl arsines) are, generally speaking, inferior to mustard gas (thiodiglycol chloride), though it is admitted that the superiority of the latter is less marked in offence, owing to its delayed action and persistent properties. The statement is made that "mustard gas" "will certainly be used in the field as soon as the military circumstances are considered favourable," though we do not fully agree with the reasons given for the failure to use it so far. The experience of the German chemical experts with hidebound bureaucrats and grasping industrialists points to the conclusion that chemical-warfare authorities must have a free hand, so that they may be able to act at once in case of a surprise—for surprises there may be. Incidentally, a small bouquet is offered to the British industry concerned with protection against chemical warfare.

The purely scientific data are very largely adapted from Sartori, but there are several important additions from the author's own experience. Some noteworthy statistical results compiled from last-war casualty lists will no doubt be surprising to the uninitiated, but if chemicals are to be used as a weapon of offence against civilian populations, such purely military figures may not be a trustworthy guide.

Certain omissions there may be, but in connection with a subject so surrounded by secrecy this is hardly surprising; and, even though the author may be a man with a grievance, readers unversed in high military policy will be amazed at the atmosphere of muddle, red-tape, and distrust of scientific men that existed in high places in war-time Germany in 1914-18.

TABLES OF PHYSICAL AND CHEMICAL CONSTANTS. By G. W. C. Kaye, O.B.E., M.A., D.Sc., F.R.S., and T. H. Laby, M.A., D.Sc., F.R.S. 9th Ed. London: Longmans. Pp. 181. 18s.

That this invaluable work of reference should have reached a ninth edition (not to mention an occasional "new impression") in the 30 years that have elapsed since its original appearance is sufficient warranty of its appreciation by chemists and physicists. The publication of a new edition just now will be an inestimable boon to the many workers in this country who have had to undertake new and responsible scientific work at short notice. This will be the last edition actually to be produced by the original collaborators, for Dr. Kaye died last April when the book was actually going through the press. This, coupled with the fact that he was resident in England, and Dr. Laby in Australia, increased the difficulty of war-time production, but the Physics Department of the N.P.L. came nobly to the rescue and aided the editors and publishers to finish off the work. Proof-reading is all-important in a work including so many tables, so we trust we may be forgiven for calling attention to a slight error on p. 121, where "Pa" appears for "Po" as the isotope of Z 84.

COMPRESSED AIR TERMS AND STANDARDS. London: British Compressed Air Society. Pp. 62. 2s. 6d.

This newly revised edition of a useful handbook can be obtained from the hon. secretary of the society which publishes it, at Boreas Works, Beddington, Croydon, Surrey. It contains many features of interest to users of compressed air, including articles on the selection of plant, care and maintenance of compressors, various types of pneumatic tools and air consumptions, and the British Standard for Testing Air Compressors and Exhausters, reprinted by permission of the British Standards Institution. Chemists who are not fully conversant with the terminology of compressed air will find the table of definitions useful.

Personal Notes

MR. J. K. CHURCH has been elected to the board of the Sheppey Glue and Chemical Works, Ltd., Kent.

MAJOR GEOFFREY DIXON MAYHEW has been appointed a director of Amalgamated Anthracite Collieries, Ltd., and succeeds the late Mr. E. O. Forster Brown as technical adviser to the company.

MR. R. W. FOOT is continuing as chairman of the National Federation of Gas Coke Associations, but in view of his recent appointment to the B.B.C., COL. H. C. SMITH will be executive chairman in Mr. Foot's absence.

THE HON. ELIE BEAUREGARD has been elected a director of the Canadian Industrial Alcohol Co., Ltd., in succession to the late Hon. Maurice Dupré. Senator Beauregard was subsequently elected to the presidency, which has been vacant since the death of the Hon. Gordon W. Scott.

MR. FORREST HEWIT, J.P., is chairman of the executive committee of the chemical and allied trades section for 1941 of the Manchester Chamber of Commerce. The other members are J. Allan, F. O. Ashmore, T. E. Harris, N. N. Holden, A. Sharp, P. A. Smith, F. D. Spence, T. Taylor and H. Worthington.

MR G. S. DUNCAN, M.A., B.Sc., F.C.I.S., was presented with an inscribed gold watch and a cheque at the 25th anniversary meeting of the Society of Glass Technology on November 18, to mark the occasion of his retirement from the post of Assistant Secretary and Librarian after 22 years' service.

Awards for prompt and gallant action in an explosives factory have been made to MESSRS. JOHN ROBERT DOUGLAS, senior superintendent, JAMES GRANT, process man, STEPHEN TIPPER, process man (George Medal), and JAMES MCGIVERN (British Empire Medal). Following an explosion in a factory where nitroglycerine was stored McGivern went inside a protecting mound and removed a smouldering bag, while the others entered the adjoining building, which was on fire, and extinguished the fire, thus averting a much more serious explosion which, if it had occurred, would have resulted in their death.

Obituary

MR. WILLIAM THOMAS RILEY of Oswaldtwistle, who died recently, was for nearly 50 years colour and chemical buyer for Messrs. F. Steiner and Co., Ltd., calico printers and dyers, of Church, near Accrington. He was a well-known member of Manchester Royal Exchange.

MR. VICTOR LANCELOT GOOD, one of the pioneers in the field of industrial chemistry in Canada, died recently age 62. Mr. Good, who was born in Ireland, went to Canada some 30 years ago, and became manager of the Grasselli Chemical Co.'s Montreal branch, being taken into the employ of Canadian Industries, Ltd., in 1929, when that organisation absorbed the smaller company. From 1929 until 1940, when he retired on account of ill-health, Mr. Good was resident district manager of the general chemical division of the company at Halifax, N.S.

LETTERS TO THE EDITOR

Accidents in Industry

SIR,—The dislocation and loss of efficiency which are occasioned by works accidents are now widely appreciated in industry. All factories engaged on war production receive a propaganda service jointly prepared by the Ministry of Labour and National Service and the Royal Society for the Prevention of Accidents and everywhere the problem is having earnest attention given to it.

Equally important to industry and to the nation is the avoidance of road accidents. In the second year of war more than 10,000 people lost their lives in these mishaps. In analysing a number of these fatalities it was found that a considerable proportion of the victims were engaged on war work of one kind or another. "One of our fighters is missing" is a poignant phrase given a new but equally pregnant meaning every time a road accident incapacitates a war worker.

Accidents take a toll of vehicles as well as of personnel. Sometimes the vehicle is put out of action, and in even the slightest accident there is consequent delay which helps to defeat the plans which the Ministry of War Transport is putting into operation for the quick turn-round of vehicles.

The black-out is now approaching its peak duration so that care is more than ever essential. Managements can help themselves and the nation by seeking the co-operation of all employees in the effort to avoid accidents on the road. Industry is one of the biggest sufferers from road accident incidence, so it should play a leading part in the attempt to solve this grievous problem.—Yours faithfully,

November 29, 1941. FREDERICK G. BRISTOW,
Chairman, National Executive Committee,
The Royal Society for the Prevention of Accidents.

Repair of Foreign Viscometers

SIR,—Before the war several types of special apparatus for the measuring of viscosity and consistency had been imported from the Continent and U.S.A. Under present conditions it is difficult if not impossible to get replacements when in need of repair or re-calibration.

I am a specialist in this particular field of instruments and should be glad to be of assistance whenever I possibly can; and I take the liberty of asking you to bring this to the notice of readers. I am thinking particularly of such instruments as Vogel-Ossag, Barbey, MacMichael, Gardner, Suspended Level, and similar capillary or rotational viscometers and consistometers.

It may perhaps be of interest to you to know that before the occupaion of Prague, Czechoslovakia, I had my works there, making several types of viscometer. Research conducted in my laboratory has been published in *Engineering, Industrial and Engineering Chemistry, Sucrerie Belge, Petroleum,* and other journals.

I should like to add that after normal conditions have been re-established I shall carry out repairs and re-calibration only of viscometers of my own manufacture and am offering assistance for other types only for so long as the makers of the original instruments or their agents are prevented from carrying out the work themselves.—Yours faithfully,

November 28, 1941. (DR.) L. A. STEINER.
76 Cavendish Road, London, S.W.12.

Deferment of Military Service

Exemption in the Chemical Industries

FOLLOWING the cancellation of deferment of military service for men under 25 years of age, the accompanying list has appeared of occupations where deferment may continue to be granted. Where there is no special entry for a foreman or charge hand, his position is the same as that of a man in the occupation corresponding to his practical experience as a tradesman.

Machine man (sterilising, drying plant); fireman (full-time) (private fire brigade); scientific instrument repairer (general hand); physical and chemical apparatus maker or repairer and instrument maker or repairer; driver of commercial goods vehicle (exceeding 2½ tons unladen weight); attendant to dehydration plant, naphthalene plant, phenol plant or oxide plant; process man or chemical labourer (process worker) engaged in the manufacture of chlorine and bleach, other heavy chemicals, fine chemicals and galenicals, dyestuffs, bromine, tetraethyl lead and ethylene dibromide; solvent and other chemical recovery plant worker, still-house plant operator; chemist (analytic, research), metallurgist, laboratory assistant recorder (skilled); chemical engineer; electrical engineer; mechanical engineer; accountant, qualified; accountant (others); bacteriologist; biochemist; pest control research worker (scientific worker); and physicist.

General News

It is illegal for dealers and retailers to sell paraffin oil from December 1 without licence from the Secretary for Petroleum.

The Import Duties Drawback (No. 1) Order, 1941, issued by the Treasury, came into operation on December 3. It reduces the rate of drawback on linseed used in the manufacture of linseed oil to 24s. 6d. a ton.

Among the new members of the Manchester Chamber of Commerce, elected on November 10, were Messrs. Kabbur & Co., Ltd., chemical and oil manufacturers, Radha House, 43 Higher Ardwick, Manchester 12.

Sperm oil prices, which have been raised by £3 10s. per ton, show the only change in the existing prices for oils and fats allocated to primary wholesalers and large trade users during the four weeks ending December 27.

In reply to a question in the House of Commons, Mr. George Hall, Under-Secretary of State for the Colonies, revealed that no tin ore has been exported from Malaya to countries outside the British Empire during the past 12 months.

The Royal Society for the Prevention of Accidents celebrated the 25th anniversary of the foundation of its London Council by a luncheon at St. Ermin's Restaurant, London, S.W., on Monday last. Lord Ebbisham, who presided, read a message from the King.

Provided that the requisite authority is obtained, sales of strychnine for the purpose of killing seals in Scotland are exempted from the prohibition contained in Rule 15 of the Poisons Rules, 1935, and in the Poisons (Amendment) (No. 2) Rules, 1940.

The terms of the Export of Goods (Control) (No. 41) Order, 1941 (S.R. and O., 1941, No. 1886), which came into force on December 1, make it clear that the requirement of an export licence for the export of iron and steel castings, forgings, stampings and pressings extends only to such machinery parts as are not covered by other headings in the Export Control List.

At a luncheon given by British Timken, Ltd., bearing manufacturers, to celebrate the 21st anniversary of the firm's incorporation, the deputy chairman, Mr. John Pascoe, stressed the importance of trade and technical journals and announced the company's intention of continuing to advertise in them, despite the pressure of work now in hand.

Titanium tetrachloride is noted in an article in *Safety Engineering* (1941, *83*, 1, 35) as a possible material for surveying ventilation air-currents in factories. A bottle of the liquid, it is stated, can be carried around the works, and this, when uncorked as required, gives off "a lot of smoke." It can be used to test the flow of air near surface grinders, spray booths, etc., but no data are given as to the amount of vapour that can be released without objectionable effect.

At the 279th anniversary meeting of the Royal Society last Monday, Sir Henry Dale, in his presidential address, referred to the increased preoccupation of science with warlike affairs, and to the relations between science and the State. He saw no reason to fear any threat to science from its present relations with the State, but he uttered a warning against the entanglement of science with controversial politics. Science must not be used as a political weapon, lest its standards be relaxed and fundamental researches without immediate practical appeal be allowed to fall into neglect.

Foreign News

The Metals Reserve Company, a U.S.A. Government war-time purchasing agency, is reported to have agreed to take over that portion of Peru's production of antimony, copper, lead, tungsten, vanadium and zinc, which is now sold to private concerns. According to unofficial figures, the output of minerals in Peru in 1940 include the following:—Antimony 896 metric tons, bismuth 382 tons, copper 38,557 tons, gold 8963 kg., lead 37,072 tons, manganese 222 tons, molybdenum 337 tons, silver 573 tons, tin 70 tons, tungsten 180 tons, vanadium 2167 tons, and zinc 178 tons.

From Week to Week

Oderberg Chemical Works have been taken over by three German firms—Fahlberg-List, von Heyden, and Kreidel Heller & Co. The plant, which formerly belonged to the Aussig concern, will be operated as a separate unit jointly by the three German companies.

Petrol shortage has greatly interfered with the use of motor vehicles in Indochina. Serious efforts are being made to replace the imported fuel with locally produced dehydrated alcohol. This is at present manufactured by the Société des Distilleries de l'Indochine, and, according to available information, is extracted from rice.

Celulosa Almeriense is the name of a new company formed in Almeria (Spain) with a capital of 67 million pesetas, which may later be raised to 92 million, for the production of cellulose. Esparto grass will be used as a raw material and the annual output will be 22,200 tons. Two plants are to be built first, and the capacity will rise to 32,500 tons annually when a third plant is added.

Scheelite production in New Zealand has increased from 41 tons in 1939 to 74 tons in 1940. In spite of efforts made to increase this further, present indications are that production will be about the same as last year. All the scheelite produced during 1939 and 1940 was sold under contract to the British Government at an average price of £NZ205 per long ton f.o.b. New Zealand ports.

Forthcoming Events

The annual meeting of the **Electrodepositors' Technical Society** will take place at the Northampton Polytechnic, St. John Street, London, E.C.1, on **December 8** at 4 p.m., when Mr. G. G. J. Adey will present a paper entitled "Mass Production of Electro-Galvanised Strip and Sheets," after the business of the Society had been transacted.

A joint meeting of the **Institution of Chemical Engineers** and the **Chemical Engineering Group** will be held on **December 9** at 2.30 p.m. in the rooms of the Geological Society, Burlington House, Piccadilly, W.1, when a paper entitled "A New System of Double Filtration for Sewage and Certain Trade Waste Waters" will be presented by Dr. A. Parker, F.I.C., Assistant Director of Water Pollution Research.

A meeting of the Colour Group of the **Physical Society** will take place at 2.35 p.m. on **December 10** in the Lecture Theatre of the Electric Lamp Manufacturers' Association, 2 Savoy Hill, London, W.C.2, when a paper on "Colour Blindness and its Importance in Industry" will be read by Dr. F. G. H. Pitt, Ph.D., A.R.C.S.

The **Oil and Colour Chemists' Association** is to hold a joint meeting with the Birmingham and Midland Section of the **Society of Chemical Industry** at the Chamber of Commerce, Birmingham, on **December 11,** at 4 p.m., when Drs. J. R. Alexander, G. L. Wild, and F. J. Siddle will present three short papers on synthetic resins.

A meeting of the **Pharmaceutical Society of Great Britain** is to be held at 17 Bloomsbury Square, London, W.C.1, on **December 11,** at 2.30 p.m., when the Harrison Lectureship medal will be presented to Mr. Thomas Tickle, B.Sc., F.I.C., Ph.C., Public Analyst for the County of Devon. Afterwards he will deliver the Harrison Memorial Lecture on "The Influence of Analytical Chemistry on Pharmacy."

A general meeting of the **North of England Institute of Mining and Mechanical Engineers** will be held at 2 p.m. on **December 13** in the Lecture Theatre of the Institute, Newcastle-upon-Tyne.

The London section of the **Oil and Colour Chemists' Association** will hold a discussion on "Engineering Aspects of Paint Manufacture," at the Federation of British Industries, 21 Tothill Street, London, S.W.1, on **December 13,** at 2.15 p.m. The discussion will be opened by Dr. J. O. Cutter; Mr. W. E. Wornum and Mr. G. W. Read-Baker will speak for the chemists and the engineers respectively.

Metallurgical Section

December 6, 1941

METALLIFEROUS BY-PRODUCTS

Treatment of Poor-Grade Material

by C. C. DOWNIE

TREATMENT of poor-grade metalliferous waste and by-products was largely abandoned after the last war, as enough rich ore was forthcoming from the usual sources, but it is possible that the same reclamation system may again be revived in order that less strain be put upon shipping facilities. It is not correct to conclude that most of these reclamation processes were highly uneconomical, although the margin for profit might, in normal times, be considered somewhat meagre. The main feature of the work is that a source of what might be termed untapped raw materials is made available.

The by-products referred to are different metalliferous clinkers, ashes, flue residues and fume, rubble, and collected furnace residues, not to mention remains of furnace bottoms and refractories which have served as hearth linings. All these are known to contain appreciable quantities of metal in a small way, but so far as ordinary works practice is concerned they are ignored, since, if for no other reason, the best type of plant for systematically carrying out the reclamation is not available. Probably most reclamation work of the kind was first dealt with in tin smelteries where slags were subjected to repeated specialised treatment, but this did not always account for the zinc, arsenic, etc., which were got rid of as early as possible. By applying volatilisation on a large scale, practically all the volatile metals can be recovered economically, the metals referred to including lead, tin, zinc, antimony, arsenic, and others, which are separated in the form of oxides from the volatilised gases. Work of this kind is of little economic value unless carried out on a really large scale, and one plant has claimed to handle more than a million tons of metalliferous by-products annually. The products recovered varied according to the nature of the mass principally dealt with, but in one instance 18,000 tons of lead oxide, and 115,000 tons of zinc oxide were recovered. As most of the lead, and almost all the zinc ore smelted in this country has to be imported from abroad, it will be appreciated that a measure of independence could be gained by reviving this reclamation work, and with the advantage that improved plant is nowadays available.

Labour-Saving Lay-out

The lay-out consists of 24 large kilns and 9 smaller kilns, but as these are mechanically charged by more or less automatic methods, comparatively little labour is required, as the men engaged have to act more in the capacity of attendants than of experienced smelting operatives. By applying the rotary kiln system, intermediate processes, such as briquetting the mass, followed by drying, including roasting and calcining work, is obviated. The elimination of these intermediate treatments does not mean that there is any diminution of the proportion of metal extracted, since the improved adaptations of the electrostatic filter system provide an almost absolute recovery. The total amount of sulphur in these residues is rarely enough to form quantities of sulphur dioxide sufficient to necessitate special treatment, so that the waste gases may be allowed to pass to the atmosphere with impunity. Carbon dioxide and also water present in the charges offer no difficulties in this way, and introduce no practical complications into the volatilisation process. When work of this kind was carried out during the last war, the output recovered had more or less to be taken as it was received, as the principle of operating by a system of steps at accurately controlled temperature was then unknown, and many complex ores had to be ignored. By the improved system, different sections of the lengthy rotary hearth are so heated that it is possible to break up almost the most complicated materials containing the aforementioned metals.

Minimising Sulphur Discharge

All raw materials are fully analysed chemically before introduction, as otherwise some injurious volatile material might be present; hence the ordinary method of analysis in which oxygen, etc., is taken by difference, cannot be considered. The analysis is expected to account for at least 99.5 per cent. of the components present. These have then to be sorted and graded so that when much "sulphury" material is present, it is allocated to one particular section, where sufficient copper or other metal holding a pronounced affinity for sulphur already exists. The work combines much of the older shaft-kiln systems, roasting, and oxidation, as outlined by earlier workers, and accordingly the temperature and conditions are so manipulated that any sulphur present is fully combined, and given little opportunity to evolve its gaseous product. Thus the yield of zinc is not seriously influenced, and the little sulphur which is converted to sulphur dioxide passes off to the exit gases. This is dependent upon the selective affinities of the different metals for sulphur, and belongs to a science which for many years has been more or less ignored, as there was little mixed metalliferous material of the kind in this country to deal with, *i.e.*, of the richer variety.

In short detail, the plant consists of a capacious hopper device where the charge is dumped, and carried by screw elevator to a bucket elevator which raises the mass to the level of the rotary kiln. The latter is a vast construction, possibly upwards of 100 yards in length, and is set at a gently inclined slope. Truck loads of metalliferous waste, after being sampled and analysed, are discharged into the hoppers, and the screw elevator further assists the initial mixing process. Unlike most metallurgical works, where every available square yard of space is put to use, the foregoing rotary hearth is so installed that great spaces exist on either side, where what might be termed "spare" material is dumped. This facilitates the initial mixing process, and puts less strain on the general system, as it ensures a certain measure of consistency of charging. What material cannot be volatilised is regarded as being more or less waste, and is ejected from the lower end of the rotary kiln. (This relates chiefly to copper from brass residues, which are usually dealt with by an entirely different process).

The gasified material passes from the rotary kiln along a capacious flue or gas-line to a gas-cooling system, where a preliminary dust extraction is obtained, and thence it passes through a change-over gate valve to the electric filters, or electrostatic apparatus. An auxiliary gas-line draws off the hot gases from the exit end of the kiln where the non-volatile residue is dumped, and further assists the oxidation process after the volatile oxides have passed from the rotary kiln. A powerful fan arrangement draws off the total gases through the plant to the exit flue and stack. Instead of good selected coal being used as the fuel,

small coal, anthracite dust, and coke waste are utilised, since, although much ash may be present this is of little account to this particular type of process, as it is all dumped at the exit end of the kiln. Whereas the shaft-kiln necessitated selected lump coke to make a success of the system, this is superfluous with the capacious rotary kiln, while an excess of moisture in the fuel is likewise of no account.

Practical Features of Firing-Control

The metalliferous waste and waste coal receive a coarse grinding treatment as they pass into the rotary hearth, and the work is not impaired should wet sludges be included, so that no discrimination need be made as to the physical condition of the mass. In traversing the kiln, some 2 hours are necessary as a general rule, which gives some indication of the protracted nature of the process. Good combustion of the fuel is ensured by arranging for the air to enter the kiln in the opposite direction from that in which the solid material descends the incline. The fresh charge is first dried as it enters by the outgoing gases, and, according to the material handled, is usually heated to about 1000° C. The continually moving shell of the rotary kiln supplies heat indirectly by radiation, while the shifting surface of the mass receives the heat from the gases; thus the material benefits by a double heat transfer, and is fully pre-heated before entering the main zone, where the temperature is raised to about 1200° C. Before leaving at the exit end, many of the more complex materials require a further treatment at higher temperature to ensure the maximum yield of volatile metal content, and it is here that the mass passes to a set of small kilns of the ordinary stationary variety, fired either by pulverised coal or by oil. In one section or another of the system, the lead, tin, and antimony, not to mention arsenic and other less important impurities, are selectively evolved, while zinc is independently volatilised, this last representing the chief item of the recovery.

Two-Stage Process

By this multi-firing practice, practically all oxygen in the furnace gases is consumed, and tests are made to determine what small proportion of this element still exists. Thus both reduction and oxidation can be successfully performed, and the process split into two distinct stages. Samples of the mass are removed from different sections of the lengthy hearth to ascertain how far oxidation or reduction has proceeded, and care is taken to note the colours of the flames formed, which are put on record continuously. As a rule, flames with a strong green zinc colour may be observed throughout the length of the reaction zone, and towards the conclusion carbon monoxide increases and the total amount of zinc in the oxide-laden gases falls off. At the final stage, the flames lose their high colour due to this increase of carbon monoxide, which indicates to the furnace attendant how the mass is reacting. It is claimed that both reduction and oxidation can be made to coincide in time and space so that they function as a single thermic event, *i.e.*, the same heat is utilised for a dual purpose. Reduction is obtained both by direct contact with carbon and also by carbon monoxide, but, generally speaking, complete analysis of the gases is a good indication of how the work is proceeding, and for this reason automatic analysing and recording outfits are installed at different sections of the rotary kiln, and also at the small end-kilns and the flues. Although in some respects appearing to be a fresh departure from existing practice, it was earlier known by zinc firms that such a system of metal separation was possible, but in view of the plant limitations at the time, no efforts were made to implement this on a really large scale. At different stages of the collecting process, the various metals are separated, whereas originally the intention was to simply ensure a practical separation of lead and zinc. When the metalliferous waste contains no copper, all the ordinary base metals which are volatile are reclaimed, and the only waste is represented by waste heat which can be utilised for generating steam. Although the foregoing type of process is carried out on the Continent and the U.S.A. it is doubtful whether it has yet received any recognition in this country, but, despite the somewhat elaborate nature of the lay-out, it is possible that it may yet be utilised as a means of tapping poor sources of metals which otherwise would require to be imported from abroad.

Australian Bauxite

Unexploited Mineral Wealth

LARGE deposits of bauxite occur in New South Wales, and an extensive geological survey has been conducted by the Department of Mines. The deposits, states the *Industrial Australian and Mining Standard*, are amenable to mining by cheap methods, and are of good quality, comparable with the bauxite utilised abroad. There is said to be sufficient good bauxite available to meet Australia's requirements for several years. Although a great majority of the deposits have been held by private interests, no attempt has hitherto been made to utilise the materials for aluminium production, except for a small amount mined by one of the principal lessees, the B.H. Pty., for use as a flux in steel smelting Aluminium, fabricated at present in New South Wales, is obtained from ingots imported from Canada by the Australian Aluminium Co., the shares of which are held by the British Aluminium Co., Aluminium, Ltd., of Canada, Electrolytic Zinc Co. of Australasia, and Metal Manufacturers, Ltd.

Although it has been suggested that the Commonwealth was moving in the matter of the production of ingot aluminium, there is no definite indication that Australian bauxite will be utilised for that purpose; significantly enough, the Commonwealth Department of Supply has arranged for the import of 25,000 tons of bauxite, and it is known that some thousands of tons had been landed at Port Kembla at a reputed cost of £4 10s. a ton delivered. Against this, equally good bauxite could be delivered at Port Kembla from native deposits at about £1 a ton.

New Aluminium Company

A Melbourne company, however, has applied to the Commonwealth Government for permission to register a company with a capital of £1,500,000 to manufacture aluminium in Australia from Australian bauxite. The company proposes to establish a plant at Port Kembla in the initial stages of the industry, and subsequently a plant in Queensland to treat Mt. Tamborine bauxite. The proposed company will be named the National Aluminium Mining and Smelting Co., and will be sponsored by Sulphates Pty., Ltd., and other associated mining and metal interests in various Australian States; the company will be entirely controlled in Australia. Sulphates Pty., Ltd., has chemical factories at Spotswood and Yarraville, Victoria, manufacturing aluminium oxides and aluminium salts.

Mr. Menzies, then Prime Minister, said in Parliament that the Government had reached a decision in respect to the production of aluminium, and that it would give preference to an Australian organisation having a preponderance of Australian capital and not connected with the international aluminium combine. The Government had received certain proposals, and ample opportunity had been given to every Australian company to submit proposals. The secretary of the Aluminium Advancement Association expressed the opinion that more than £1,000,000 of local capital was available for the establishment of an Australian aluminium industry. He added that more than 30,000 tons of high-grade ore had already been mined, some of it returning an analysis of from 53 to 58 per cent. of alumina, and that the bauxite committee estimated New South Wales' deposits at 10,000,000 tons, in addition to which there were substantial deposits in Queensland.

Leaflet M20, published by MUREX WELDING PROCESSES, LTD., Waltham Cross, Herts, deals with copper, bronze and brass welding by the electric arc process. The method offers many advantages over other processes, especially in the case of heavy sections, where ease and economy of operation and the speed with which heavy deposits can be made are in its favour.

Concentration of Manganese Ores

Successful Treatment of Low-Grade Deposits

GREATLY increased manganese production from domestic sources in the U.S.A. appears more than probable from a report that the Bureau of Mines has been successful in producing concentrates with high manganese content from the low-grade deposits in the Las Vegas area, in Nevada. Dr. R. R. Sayers, Director of the Bureau, announces that a test run by a pilot plant at Boulder City has fully demonstrated the applicability of a process developed in the Bureau laboratories for supplying a portion of U.S. defence requirements of manganese from home sources.

Only high-grade ore, such as the Russian ore, containing 48 per cent. or more manganese, has generally been used by American producers in making ferromanganese, the form in which manganese is usually added in steel manufacture, and although few deposits of high-grade ore exist in the United States, there are large reserves of low-grade ores, which have hitherto been of no value because no feasible methods for successfully treating them had been developed. Now, however, the United States may be able to supply a major portion of its requirements from its own resources. The Bureau engineers estimate that there are nearly a million tons of ore in the Las Vegas area containing more than 10 per cent. manganese, more than 3600 tons of which, averaging about 18 per cent., have been mined and stored at Boulder City.

Success in the treatment of this ore was first attained when a new reagent, DLT-958, was tried. This reagent, developed by a chemical company as a result of the laboratory investigations of the Bureau of Mines, was found to float the worthless gangue away from the managese and leave the manganese in a form which, when sintered, met every requirement for material for the manufacture of ferromanganese. Subsequent tests have shown that other reagents of similar characteristics may be used, so that successful operation of the plant is not restricted to a particular reagent, but the importance of reagent development to the successful flotation of manganese ores cannot be too highly emphasised.

First returns from the laboratory show that the pilot plant operation confirms in every way the laboratory work of the Bureau staff and the concentration of another large domestic deposit of manganese based on the work of the metallurgists has been demonstrated on a large scale. The product produced in the first operations analysed after sintering: 52 per cent. manganese, 1 per cent. iron, 9 per cent. silica. The recovery from the ore was just over 70 per cent., and this may be increased as the operation of the plant is further perfected. Laboratory experiments have shown that the lead and copper present in concentrates of the Las Vegas ore can be eliminated by a roasting treatment. Operations will be continued at the pilot plant to determine complete data concerning costs.

Oxide Films on Iron

Effect of Fatty Acid Vapours

PROTECTIVE films are formed on iron by a less severe treatment than usual. An oxide film 200 Å. thick is produced on the surface of Armco iron in 4 hours at 200° C. Mokrushin and Potarkuev (*Coll. J. Russ.*, 1941, *7*, 3) studied the effect of additions of fatty acid vapours to the air in which the iron was heated. The rate of growth of the oxide film is hardly affected by oleic, palmitic, or stearic acid vapour. In 4 hours a film 530-580 Å thick is built up. The films formed in the presence of fatty acids exert a slightly better protection against atmospheric corrosion than those obtained in air alone. A difference persists also for a short anodic corrosion in 3 per cent. NaCl solution, but no difference can be detected when the corrosion experiments last more than 1-3 hours. The protection afforded by oleic acid is even less permanent than that given by palmitic or stearic acid.

Aluminium in India

Good Progress with New Plant

FABRICATION of aluminium in India has received a great stimulus from the progress of the Aluminium Production Company of India, Ltd. A special correspondent in Calcutta informs us that their rolling mills, located near Calcutta, have now gone into production. These mills are provided with the latest equipment for the rolling of aluminium and are believed to be on a par with the newest mills of similar type in Britain or America. The aluminium smelter of the same company in Travancore State is now under construction, and rapid progress is being made both on constructional work and on delivery of the equipment which cannot be made in India, a large part of that equipment having already arrived in India. It is expected that this smelter will be brought into production early in 1942.

American Titanium Supplies

Imports Chiefly from India

TITANIUM ore is finding increasing use in American industry; and India, by far the world's largest producer of this ore, is the United States' main source of supply. Domestic production is small and although titanium ores in the form of rutile are imported from other countries in considerable quantities they have a low titanium oxide content. Titanium ore occurs as ilmenite in India, and is found in association with monazite, from which thorium nitrate is derived. Formerly it was considered a by-product of the monazite industry. In recent years, however, it has become more important than monazite because of the demand for its contents of titanium oxide in the manufacture of titanium paints.

The ores, which are useful primarily because of the whitening and obliterating powers of the oxide, are used in the United States not only in the paint industry—their main use—but also in the rubber, linoleum, leather, plastic, soap, printing ink, textile, ceramic and ferro-alloy industries. The importance of the ores is indicated by the large imports, amounting to over $1,100,000 in value in 1939 and to about $233,000 in the first quarter of 1940.

COLOURING MAGNESIUM

The Dow Chemical Company has developed a method for dying magnesium and its alloys any desired colour, forming a corrosion-resistant coating which protects the magnesium against corrosive chemicals and atmospheric conditions. The method involves first cleaning the magnesium by sand-blasting or buffing; then the metal or its alloy is placed in an autoclave containing a dilute caustic alkali solution together with the dye of the desired colour, which is soluble in alkali. The solution is next heated above its boiling point until a pressure of at least 20 lb./sq. in. is built up in the autoclave. The dyeing treatment under pressure is maintained for a period of from one to thirty minutes, according to the depth of colour required. Even if the dye is not added to the alkali solution, the treatment will still produce a corrosion-resistant coating on the magnesium.

Magnesium metal will, it is reported, soon be produced as a by-product from the output of the Union Potash and Chemical Co. potash mines at Carlsbad, New Mexico. In the refining of sylvinite and langbeinite to produce fertiliser potash salts, a quantity of magnesium chloride is recovered as a waste product. The company is now dehydrating this and intends to run a metallic reduction plant to recover the magnesium metal.

Shipments of Chilean copper to Britain, which were severely curtailed after the outbreak of war, appear to have ceased altogether this year. It is also reported that Japan has opened negotiations with Chile for supplies of copper and various minerals on a barter basis, but that delegates of the U.S.A. Metals Reserve Company have offered to buy the entire Chilean output of many of these minerals.

Germany's War-Time Bauxite Supplies

Deposits in South-Eastern Europe

GERMANY, as the world's largest producer of aluminium, is the largest consumer of bauxite. Germany manufactures aluminium from imported ores exclusively. Domestic deposits of bauxite are not very extensive and supply a poor grade of ore, which even after artificial concentration in the smelting process is costly. It is, however, used in the production of artificial corundum, of aluminium salts, and latterly for the extensive production of refractories for the iron industry. Domestic bauxite can be used in the manufacture of aluminium, but this use is necessary only in an emergency, when Germany would be unable to obtain ores from foreign countries. According to the local Press, German aluminium works, acting on an agreement with the price commissioner, decided voluntarily to lower prices. Effective June 1, 1941, the price of Huetten-aluminium was reduced by 5 reichmarks (4½ per cent.), to 127 reichmarks per 100 kilograms. The following information regarding other sources of bauxite for Germany is abridged from a report of the U.S. Bureau of Mines.

High-Grade Deposits in Hungary

Hungary is one of the most important sources of bauxite in the world. Its resources of bauxite ore are more than 250,000,000 tons larger than those of any other country. Hungarian bauxite deposits are located in various regions, the most important of which is at Gant near Mor in the Vertes Mountains. Up to the present extensive mining, chiefly open-cut, has been carried on only in this region. Since the deposits are soft, they can be worked easily by hand at low cost Gant bauxites are of relatively high grade despite the fact that the composition of deposits varies considerably. Bauxite worked in the last few years contained between 50 to 63 per cent. Al_2O_3, 2 to 4 per cent. SiO_2, 15 to 30 per cent. Fe_2O_3, 2½ to 4 per cent. TiO_2, and 16 to 20 per cent. moisture. The second largest region lies in the forest of Bakony near Halimba, between Tapolcza and Sumey. At present the deposits are not being worked. The bauxite is low grade and open-pit mining is not feasible because of the heavy overburden. The third district in which a high-grade bauxite (65 per cent. Al_2O_3) is present lies in southern Hungary near the border of Yugoslavia. These deposits, however, are not extensive. The ore is to be mined by underground methods, and an output of 5000 tons annually has been planned. The reserves of the district are reported to be 200,000 tons. Near Perepuszta a similar deposit is being mined to a small extent by open-pit methods.

In 1938 Hungary mined 521,400 tons of bauxite and ranked second in world production. For a number of years several thousand tons of Hungarian bauxite were consumed by the domestic aluminium industry and the rest was exported to Germany. The aluminium plant of Csepel was put into operation in 1935; the plant of Felsogalla in 1940. The Hungarian deposits are some of the most important and dependable sources of supply of the German aluminium industry.

Yugoslavia: Transport Difficulties

Yugoslavia also has extensive bauxite deposits, partly of high grade. Mining is carried on in a relatively small area; in Herzegovina, mainly at Siroki-Brijeg west of Mostar (53-60 per cent. Al_2O_3), and in two regions of Dalmatia, at Sinj in Split and Drnis in Sibenik (52-63 per cent. Al_2O_3). In the interior of Dalmatia, near Imotski, are large and little-known deposits, which have not yet been worked and which extend to the north and to the east as far as Bosnia. Deposits, evidently of a high grade, are present in Montenegro between the coast and Lake Skutari near Bar and Ulcinj and in the interior west of Niksic. These deposits cannot be worked at present owing to the inadequacy of transport facilities. The regions differ greatly with respect to type of deposits. In the Mostar region bauxite appears principally as the filling of sink holes (*doline*) in the surface of the carstic mountains and can be worked by open-cut methods. Deposits in the Drnis and Sinj regions are covered more deeply and have to be worked by underground methods.

In 1938 Yugoslavia produced 405,000 tons of bauxite and ranked third in world production. According to latest official mining statistics (1935) 76.5 per cent. of the output was allotted to Dalmatia and 23.5 to Bosnia-Herzegovina. Since 1937 aluminium manufacturing has been done on a small scale in Dalmatia, but has been sufficient to meet domestic requirements. Most of the output is exported to Germany by water, as land routes are not good and are relatively expensive. The domestic needs of Yugoslavia will never be large, and increasing production for export is not feasible as it is harder to export metal than bauxite because of protective duties. The favourable location and the quality of the ores assure Yugoslavian bauxite a good outlet to all bauxite-importing countries.

Rumania's bauxite deposits have been known since 1916 and lie in the Bihor mountains west of Klausenburg in Siebenbürgen, which belonged to Austria-Hungary at that time. Reserves are estimated at 2 to 10 million tons, possibly more. Analyses of Rumanian bauxite vary greatly. Generally speaking, the ore is not as high-grade as that of Hungary. By carefully composing ore supplies, 53 to 61 per cent. Al_2O_3, 1.4 to 1.7 per cent. SiO_2, 1 to 3 per cent. TiO_2, and 20 to 25 per cent. Fe_2O_3 can be guaranteed. Other sources of information give analyses of 61 per cent. Al_2O_3, 3 to 7 per cent. SiO_2, 10 to 25 per cent. Fe_2O_3, and 11 to 14 per cent. moisture. Rumanian bauxite is not valued as highly as the Hungarian by German consumers. Also, it appears in firm deposits and has to be mined by dynamiting, which makes it more costly, and deposits are not favourably located as regards transport facilities. Mining has been resumed in the Bihor district in the last few years. An output of 12,000 tons, or 0.3 per cent. of world production, has been reported for 1938. German experts have experimented to determine whether the deposits can be worked on a large scale, but a final decision has not been reached. Rumania considered establishing an aluminium industry, but such an industry will scarcely be able to exist on a large scale. Owing to transport difficulties bauxite can only be shipped to Germany, which at present prefers the Hungarian product, so that the prospects for exporting this ore are not encouraging.

MAGNESIUM RECOVERY PROCESS

A new process for the recovery of magnesium from low-grade ores is reported from Italy. In a patent granted to Carlo Adamoli of Milan methods are indicated for obtaining the metal, quite free of impurities, from magnesium-containing ores such as talc, magnesite, dolomite, etc. The process involves a single direct operation and avoids the loss of metal which is ordinarily incurred when it is necessary to melt the metal because of a lack of compactness. The process is cyclic, the material being passed through again and again. The ores are treated with hydrofluoric acid to form magnesium fluoride, a reducing agent is mixed with them, and the magnesium metal is given off in a vapour, to be condensed to the solid form. The hydrofluoric acid is then regenerated and combined with further quantities of the ore.

PLASTIC TREATMENT OF COPPER

A new type of copper designed to meet the need of the electrical industry for a copper of greater conductivity, ductility, fatigue resistance and surface quality is announced by the Phelps Dodge Corporation, U.S.A. The metal is made, without melting, from cathode copper, which is plastically converted by tremendous pressure in a reducing atmosphere at high temperatures into smooth, dense copper bar, rod, strip or other commercial shape. The metal is said to be particularly applicable where severe vibration is a problem.

Chemical Matters in Parliament

Peat Fuel

IN the House of Commons last week, Captain Strickland asked the Secretary for Mines what was being done by his department to encourage the production and use of peat as a fuel and as a potential source of petrol supply, and what was being done to utilise the vast supplies of that commodity on Dartmoor.

Replying, Mr. Grenfell said that the Committee on Low Temperature Carbonisation, under the chairmanship of Lord Henley, last year reported against any large scale development during the war, but that he had recently asked them to reconsider the matter in the light of the present coal situation.

Scientific Co-operation

Mr. Eden, answering two separate questions on the possibility of an exchange of scientific missions between Britain and Russia and scientific co-operation with the United States, said that the first question had been discussed with the Soviet Government, and while such an exchange would be welcome to both Governments, there were obvious practical difficulties in putting it into effect at the present moment. Upon the second matter Mr. Eden replied that a comprehensive scheme was in operation for the interchange of scientific information which arose during the course of supplying armaments from this country and the U.S. The United States had established a scientific mission here corresponding to Dr. Darwin's mission in Washington, and there were in the case of war material well-established channels through the Service Attachés of both countries; there was also a frequent interchange of visits by experts of all kinds.

British Chemical Prices

Market Reports

MARKET conditions generally are reported as steady with deliveries against existing contracts covering good volumes. Whilst no important price changes fall to be recorded this week values throughout are strong. Trade in borax and boric acid is active on the recent advance and offers of oxalic and tartaric acids are finding ready buyers. Acetic acid is also in active request. In both the soda and potash sections the chief feature is the scarcity of some products to meet current requirements. Arsenic supplies are reported to be insufficient to meet the demand and quotations are nominal. In regard to the coal tar products the market is under the influence of a possible control of prices of a number of items. Supplies of naphthalene and carbolic acid are fully taken up for home requirements and an active market is reported for toluol. The xylol position is a little easier on the week.

MANCHESTER.—Quotations throughout all sections of the Manchester chemical market during the past week have been on a firm basis, although, apart from a rise in white acetate of lead crystals, actual movements have been few. On the whole, fresh inquiry for most of the leading "heavies" during the week has been on a fair scale and steady deliveries against contracts have been made against specifications from the using trades, including the textile bleaching, dyeing and finishing sections. Among the tar products a steady trade is passing in most lines, but in the case of cresylic acid and crude carbolic new business is held up pending announcements regarding control. High prices which are being indicated for the former must therefore be regarded as nominal.

GLASGOW.—In the Scottish heavy chemical trade business has been rather better during the past week for home trade. Export inquiries have been rather limited. Prices generally continue very firm, but where altered are rather dearer. Borax and boric acid prices have again been increased.

Price Changes

Cresylic Acid.—MANCHESTER: Pale, 99/100%, 5s. 3d. per gal.
Lead Acetate.—MANCHESTER: £51 to £54 per ton.
Xylol.—Commercial, 3s. 6d. per gal; pure, 3s. 8d. MANCHESTER: 3s. 4d. to 3s. 9d. per gal.

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Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for errors that may occur.

Mortgages and Charges

(Note.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every company shall, in making its Annual Summary, specify the total amount of debt due from the company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.)

P. A. C. PHOTOGRAPHIC ACCESSORIES & CHEMICALS, LTD., London, E.C. (M., 6/12/41).—November 12, £3000 debenture to Industrial Finance & Investment Corporation, Ltd.; general charge.

MAY & BAKER, LTD., Dagenham, manufacturing chemists (M., 6/12/41).—November 11, debenture to Lloyds Bank, Ltd., securing all moneys due or to become due to the Bank; general charge. *Nil. January 10, 1941.

Company Winding-Up Voluntarily

FERROPHANE, LTD. (C.W.U.V., 6/12/41). By special resolution, November 19. Samuel Rolleston Hogg appointed liquidator.

Satisfactions

STEATITE & PORCELAIN PRODUCTS, LTD., Slough (M.S., 6/12/41).—Satisfaction November 8, of debentures registered May 3, 1933, to the extent of £3200.

P. A. C. PHOTOGRAPHIC ACCESSORIES & CHEMICALS, LTD. London, E.C. (M.S., 6/12/41).—Satisfaction November 12, £1000, registered February 14, 1941.

Receiver Appointed

MASHABA RHODESIAN ASBESTOS CO., LTD., London, E.C. (R., 6/12/41).—G. L. Fox, Bilbao House, 36 New Broad Street, E.C. November 7 (by order of Court).

Company News

Clover Paint and Composition Co., Ltd., announce an interim dividend of 2½ per cent. (same).

Fullers Earth Union, Ltd., has declared a dividend of 8 per cent. per annum for half-year to September 30.

Beechams Pills, Ltd., have declared a second interim dividend on the deferred shares of 7 per cent (same).

British Benzol and Coal Distillation, Ltd., have declared a final dividend of 5 per cent., together with a bonus of 5 per cent., making 15 per cent. for the year (same).

Richard Thomas and Co., Ltd., announce a dividend of 6½ per cent. (less tax) on preference shares for the half-year ended September 30, payable on January 1 next.

Carbohydrol, Ltd., Warrington, have increased their nominal capital beyond the registered capital of £5000 by the addition of £5000 in £1 ordinary shares.

Wailes Dove Bitumastic, Ltd., have declared a final dividend of 7½ per cent., making 12½ per cent. for the year (12½ per cent. for previous eleven months).

The Yorkshire Dyeing and Proofing Co., Ltd., announce a loss of £14,149 (profit £12,590), and are paying no dividend (2½ per cent.).

The Lautaro Nitrate Company announce a final payment of 3 per cent., making 4 per cent. for the year (same) on first mortgage income debenture and first mortgage (Antofagasta) debenture stock.

Genatosan, Ltd., announce a trading profit, for the year ended June 30, of £131,377 (£135,208), and have declared a final dividend of 15 per cent., making 25 per cent. for the year (same).

The British Oxygen Co., Ltd., report dividends of 3¼ per cent., less tax at 9s., on 6½ per cent. cumulative preference shares, and 2½ per cent., less tax at 9s., on 5 per cent. cumulative second preference shares, for the half-year to December 31 (same).

New Companies Registered

Chemicals & Essential Oils, Ltd. (370,686).—Private company. Capital: £1000 in 1000 shares of £1 each. Manufacturers, refiners, importers, exporters, packers and factors of and dealers in oils, chemicals, spirits, gums, fats, soaps, waxes, varnishes, stains, colours, enamels, polishes, cellulose and pigment compositions, manufacturers of containers and holders, etc. Subscribers: Isobel H. C. M. Sarant; Phyllis M. Nish. Solicitors: R. Shapiro & Co., 21 Buckland Crescent, N.W.3.

Chemical and Allied Stocks and Shares

ALTHOUGH less active conditions have ruled in Stock Exchange markets, pending the next turn of events in the war and the position in the Far East, the general undertone was firm, and security values held recent gains. British Funds tended to higher prices, while there were numerous individual features among industrial shares, which in many instances remained firmly held and in short supply, and, therefore, again tended to respond strongly to moderate improvement in demand.

Imperial Chemical were steady at 33s. 6d., as were the 7 per cent. preference at 34s. 6d., while B. Laporte were 63s. 9d., and remained firmly held. Dealings at 35s. 9d. were shown in Fison Packard, pending publication of the financial results. British Drug Houses were around 25s., and the 5 per cent. preference shares transferred at 21s. 3d. at one time. Shares of companies connected with plastics have again shown activity, with British Industrial Plastics 2s. ordinary at the higher level of 3s. 7½d., awaiting the dividend announcement, and Erinoid shares firm at around 7s. Moreover, Lacrinoid Products 2s. ordinary were 2s. 7½d.

The units of the Distillers Co. remained in favour and rose further to 74s. 6d., aided by confidence that the forthcoming interim payment is likely to be maintained and the total dividend kept at 16¼ per cent. There was again buying of United Molasses 6s. 8d. units, which at 31s. 3d. yield approximately 5¼ per cent. on the basis of last year's distribution. Triplex Glass 10s. shares remained active, and were around 32s.; the yield is very small on last year's 10 per cent. dividend, which, however, was a conservative payment, as 24 per cent. was earned, and the market is hopeful of a higher dividend payment for the current financial year. United Glass Bottle shares have been firm at 57s. 6d., while business at 52s. 6d., was recorded in Key Glassworks; results of the last-named company are now due. Firmness has been shown in Turner & Newall at 75s. 7½d., awaiting the impending dividend announcement, and Murex moved higher to 93s. 9d. On the other hand, disappointment in the market with the slightly lower interim payment was reflected by a decline in Barry & Staines to 37s. 6d., but Nairn & Greenwich were steady at 61s. 3d. In other directions, there was again a good deal of activity in British Plaster Board 5s. ordinary, which held most of their recent advance, having transferred around 20s. Associated Cement were higher at 52s. 6d.

Iron and steel issues tended to improve, buyers being attracted by the apparently generous yields. United Steel were 23s. 7½d., and Tube Investments 88s., while Stewarts & Lloyds improved to 46s. 7½d. Richard Thomas 6s. 8d. ordinary were better at 5s. 6d., and the 6½ per cent. preference were around par. Dorman Long, however, were 22s. 4½d., and were inclined to ease pending the dividend announcement. Allied Ironfounders moved higher to 22s. 9d. At 28s. Lever & Unilever lost part of their recent rise, as did Dunlop Rubber at 39s. 3d., but there was further improvement from 44s. 9d. to 45s. 4½d. in British Aluminium. On the other hand, following their recent strong rise, Wall Paper Manufacturers deferred units further eased from 28s. to 26s. 9d. In advance of the dividend decision, however, Imperial Smelting held last week's improvement to 12s. 6d., and business at 21s. 3d. was recorded in the 6½ per cent. preference shares. Under the influence of the interim payment, Griffiths Hughes improved to 11s. 7½d. Elsewhere, Boots Drug 5s. ordinary were firm at 37s. 6d., and Beechams Pills 2s. 6d. deferred were 10s. 9d. Among textile issues, Lansil moved better, and awaiting the financial results, British Celanese were fairly steady, while Bleachers and Bradford Dyers improved moderately. Sanitas Trust 10s. shares transferred at 11s. 6d., and Greeff-Chemicals Holdings 5s. ordinary were dealt in at 6s. Oil shares benefited from favourable views as to the war news; higher levels ruled for "Shell," Anglo-Iranian, and Burmah Oil.

Temperature-indicating colours are described in a pamphlet entitled "Thermindex Colours," published by MESSRS. J. M. STEEL AND CO., LTD., Kern House, 36-38 Kingsway, London, W.C.2. Thermindex colours, which are in the form of a paint, give, it is claimed, a permanent and definite indication of the temperature reached on a heated surface. Actual colour photographs of metal strips showing Thermindex colour changes are included in the pamphlet. The subject was dealt with in a recent article in THE CHEMICAL AGE (1940, *42*, 1088, p. 257).